

AIR QUALITY MANAGEMENT FOR EXPOSED PLAYA

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PURPOSE

Senate Bill 277, Chapter 611, requires the selection of an alternative as part of the Salton Sea Ecosystem Restoration Study that provides “the maximum feasible attainment” of the legislated goal of “elimination of air quality impacts from the restoration projects”.

Under some restoration alternatives being considered for the Salton Sea, currently submerged or flooded areas could be exposed and become dry and potentially becoming sources of windblown dust.

Dust (also termed “particulate matter less than 10 microns in diameter”, or PM₁₀) is a regulated air pollutant, because of its potential impacts on human health and welfare. Elevated concentrations may cause respiratory ailments, especially in children. The Salton Sea region already experiences dust episodes, and the area is in serious non-attainment of national ambient air quality standards for PM₁₀.

This fact sheet summarizes the approach to Air Quality Management for areas that may be permanently or intermittently exposed under the restoration alternatives. The information presented applies to all of the alternatives.

RANGE OF ACTIONS

The Air Quality Management approach faces three challenges:

1. Emissive areas that may cause or contribute to violations of air quality standards must be identified. Non-emissive areas must also be identified.
2. Emissions from emissive areas must be controlled by some means.
3. Prevention of air quality impacts by the restoration program must be monitored and confirmed. Non-emissive areas must also be monitored and confirmed.

Under the No Action Alternative, the parties to the Quantification Settlement Agreement (QSA) are required to mitigate air quality impacts from exposed Salton Sea playa by implementing the following four steps.

1. Restrict access. Prevent disturbance of exposed playa surfaces, because such disturbance would boost natural dust emissions rates, even from relatively stable areas.
2. Research and monitoring. Research effective and efficient dust control measures for exposed playa, and monitor surrounding air quality.
3. Create or purchase offsetting emissions reductions. Develop air quality offsets, for example, from control of unregulated dust sources around the Salton Sea, where possible.

4. Implement direct emissions reductions at the Sea. Implement dust control on emissive parts of the exposed playa.

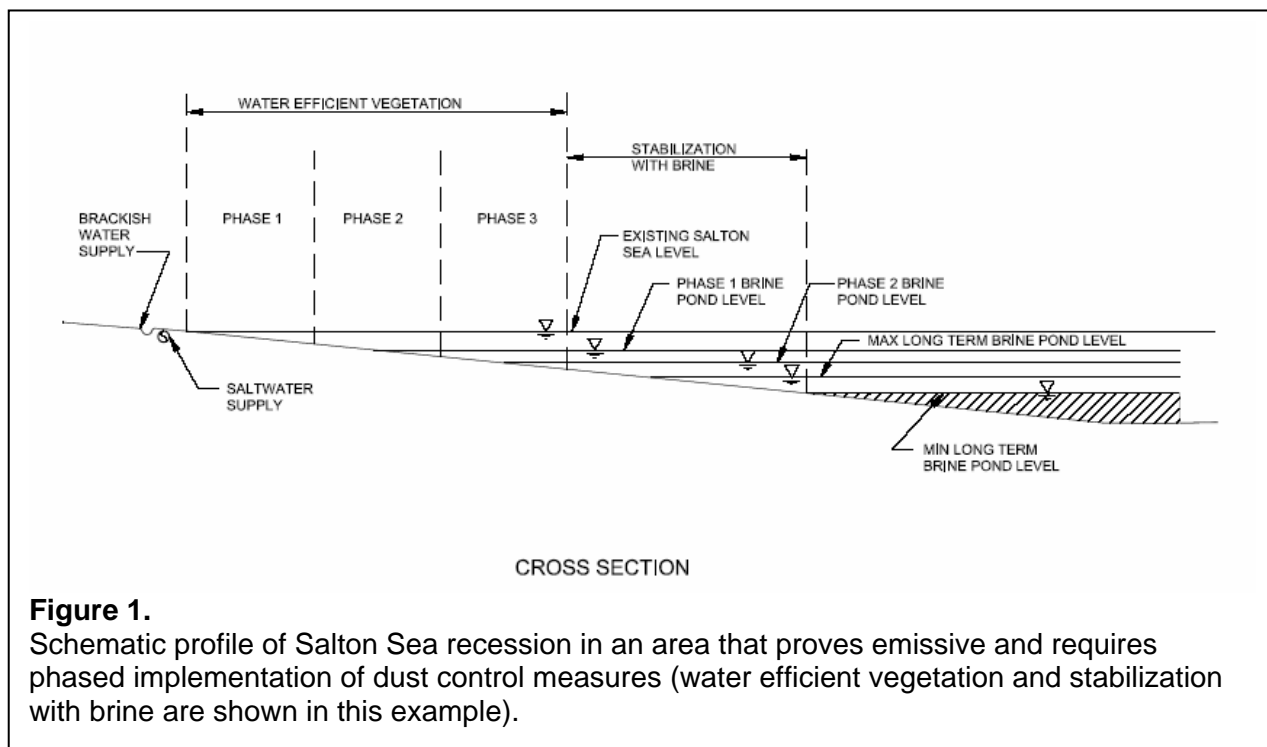
All restoration alternatives contain Air Quality Management actions primarily related to Step 4 of this process, but implementation of the entire four-step process is assumed to occur. In concert with QSA mitigation requirements, a research program focusing on development of cost-effective, water-efficient, and adaptive Air Quality Management has been initiated. In the long run, results of this effort will guide Air Quality Management approaches implemented at the Salton Sea.

For the Salton Sea Ecosystem Restoration Study, a range of dust control measures have been and will continue to be evaluated. Measures requiring little or no water are preferred, due to the many competing needs for water. Although there are many candidate dust control measures under consideration at this time, no similar area with high emissions rates has been successfully stabilized without water. Water and capital requirements for Air Quality Management under Ecosystem Restoration Study alternatives are therefore based on water efficient, but not water-free, dust control technology.

Each alternative includes the following Air Quality Management actions:

- Establish a monitoring program to determine emissivity of the playa as water recedes.
- Protect the exposed playa from disturbance as water recedes (see Figure 1).
- Based on experience in similar environments, it is expected that a substantial portion of exposed playa may not be emissive and would be transitioned to long-term monitoring. If monitoring later determines that an area has become emissive, it would be subject to control measures. For planning purposes, it is assumed that 50 percent of the exposed playa would require control, and 100 percent of the areas requiring control would be subject to Air Quality Management actions and would be monitored for their effectiveness.
- Emissive areas would be stabilized by one or more methods, such as water-efficient vegetation, surface wetting, or dry measures, such as gravel cover.
- For planning purposes, it is assumed a "worst-case scenario" with respect to water demands and infrastructure costs that would be the use of water-efficient vegetation to stabilize the estimated 50 percent of exposed playa requiring control.

A brief description of Air Quality Management technology assumptions employed in the development of the restoration alternatives follows.



WATER EFFICIENT VEGETATION

One approach to stabilizing exposed playa involves establishment of a protective, vegetative cover. The plant community increases friction resistance to wind at low elevation, slowing wind speed and erosion rates at the soil surface.

Projected conditions include little rainfall, restricted drainage, elevated levels of salinity and sodium in a variety of soil textures.

Assumed design criteria for water-efficient vegetation (WEV) currently include the following:

- Construct vegetation systems in phases as water recedes (see Figure 1).
- Water supply of sufficient quality and quantity to support the target plant community is required. Irrigation and drainage are assumed to be required.
- Two-square mile blocks of WEV would be constructed, each with a dedicated turnout/filtration facility from a mainline inflow water supply. About 15 inches of water would be applied annually, of which about 12 inches would be inflow and the remainder would be recycled drainage from the Air Quality Management area itself.
- The saline environment requires planting of salt- and drought-tolerant species.
- Selenium concentrations may be elevated in soils and/or irrigation water. Ecosystems created in Air Quality Management areas must not lead to unacceptable ecological risk. Species choice and other means to control this risk will be a research program priority.

- Artificial subsurface drainage (buried, perforated pipe) would likely be required on much of the irrigated area, but drainage should be feasible if drip irrigation is employed.
- Recovered drainage is reused and blended with inflows to conserve water and to protect fine textured soils, whose structure would severely degrade if irrigated with unblended inflows.
- On similar playas, buried drip irrigation has shown significant advantages over other irrigation techniques. For example, it is quite efficient in delivering water to plant roots, it creates less drainage to manage than virtually any other technique, and it is less prone to damage than surface drip irrigation. Drip irrigation requires filtration, but requires less pressure than, for example, sprinklers.



Figure 2.
Example of saltwater spreading onto exposed playa, as might occur in stabilization with brine.

STABILIZATION WITH BRINE

Areas below the high water level of the brine sink would be intermittently flooded with brine. During inundation, these areas would be stable. Some of this area may prove unstable when not flooded. WEV would not be viable in this area, because vegetation would be killed by sustained, periodic flooding with brine. Dust from areas at the middle of the playa are the least likely areas to affect air quality at existing population centers, but control is assumed to be required to adequately protect air quality.

It is anticipated that large areas of the exposed playa will be acceptably stable when the surface is cemented together by salt. This should be the case with these intermittently flooded areas. However, should the salt in some of this area become depleted and surfaces unstable through prolonged exposure, stabilization with brine (SWB) has been assumed for Air Quality Management facilities planning.

Facilities for SWB would include mobile or installed conveyance and water distribution. A saltwater source such as the brine sink or other saltwater storage would serve this system. Water would be applied in unstable areas to renew salt in the surface soil (see Figure 2). Upon drying, the surface stability would be renewed. The amount of applied water would depend on the extent and duration of exposure. For planning, it has been assumed that an average of 12 inches of brine would be applied to intermittently exposed areas each year.

ADAPTIVE MANAGEMENT OF AIR QUALITY MANAGEMENT

As described previously, planning assumptions for Air Quality Management, such as dust control methods and the extent of exposed playa requiring control, will be evaluated and refined as part of the Restoration Program. As specific projects are developed, refined information will form the assumptions for these projects.

A smaller area than has been assumed may require irrigation, either because larger areas of the playa are stable, or because more water-efficient dust control measures (such as gravel blanket) prove effective and implementable. In this case, additional inflows would be available for other purposes. Reallocation of this water to, for example, increased habitat area, would be possible at that time.

Additional water (in excess of Restoration Study planning assumptions) may prove to be required for Air Quality Management if larger areas prove emissive, and the potential for more water efficient measures is not sufficient to offset this increase. In this case, supplementary environmental documentation for the allocation of this supply would be required.